Claims

1. Method for sustained elimination or reduction of polarization induced signal fading in optical interferometer networks comprising

at least two optical paths from an input port to an output port, the transmission delays of the at least two paths differing by an amount of time τ,

an interrogation arrangement interrogating the optical phase differences induced between optical waves having traveled the said paths,

said arrangement containing at least one optical source launching optical power into said input port, a detector arrangement converting the optical power received from said output port into electrical detector signals, and a control and signal processing unit capable of processing said detector signals to determine the said phase difference,

the method comprising the steps of:

- altering the input polarization state produced by the source with a modulation frequency that is comparable to or higher than $1/(4\tau)$,
- receiving the at least two optical signals having traveled said at least two paths at said detector arrangement providing a detector signal,
- processing said detector signal at said control and signal processing unit determining the phase difference between the optical signals having traveled said paths.

2. Method according to claim 1, in which the input polarization state produced by the source changes between a first and a second state (SOP0A, SOP0B), and in which four interference signals (i, ii, iii, iv) being separated in time, representing interference between polarization states at said output port that originate from the transmission of

(i) SOP0A through both the first and the second interferometer path,

(ii) SOP0B through the first and SOP0A through the

second interferometer path,

(iii) SOP0B through both interferometer paths, and

(iv) SOP0A through the first and SOP0B through the second interferometer path,

respectively, are extracted by said control and signal processing unit and further processed to produce estimates for the interference phases of the four interference signals (i,ii,iii,iv).

3. Method according to claim 2, wherein the interference visibilities or fringe amplitudes of the four interference signals (i,ii,iii,iv) are calculated.

4. A method according to claim 3, wherein SOP0A and SOP0B are orthogonal polarization states, and a first improved phase estimate, called Φ_1, is calculated as the average of the two said interference phase estimates produced from (i) and (iii), and a second improved phase estimate, called Φ_2, is calculated as the average of the two said interference phase estimates produced from (ii) and (iv), and a combined phase estimate is calculated as a weighted average of Φ_1 and Φ_2, where the ratio between the weighting of Φ_1 and the weighting of Φ_2 is decided from the relation between the said interference visibilities or fringe amplitudes.

5. Use of a method according to claims 1, 2, 3, or 4, wherein the method is applied to interrogate a wavelength division multiplexed interferometer network.

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6. Use of a method according to claims 1, 2, 3, or 4, wherein the method is applied to interrogate a time division multiplexed interferometer network.

7. Use of a method according to claims 1, 2, 3, or 4, wherein the method is applied to interrogate space division multiplexed interferometer networks.

8. Assembly for sustained elimination or reduction of polarization induced signal fading in optical interferometer networks comprising:

at least two optical paths from an input port to an output port, the transmission delays of the at least two paths differing by an amount of time τ,

an interrogation arrangement interrogating the optical phase differences induced between optical waves having traveled the said paths,

said arrangement containing at least one optical source launching optical power into said input port, a detector arrangement converting the optical power received from said output port into electrical detector signals, and a control and signal processing unit capable of processing said detector signals to determine the said phase difference,

said optical source comprising polarization means for altering the input polarization state produced by the source with a modulation frequency that is comparable to or higher than $1/(4\tau)$,

9. Assembly according to claim 8, wherein the input polarization state produced by the source is adapted to emit alternately a first and a second state (SOP0A,SOP0B) through two interferometer paths resulting in four interference signals (i,ii,iii,iv) being separated in time, representing interference between polarization states at said output port originating from the transmission of

(i) SOP0A through both the first and the second interferometer path,

(ii) SOP0B through the first and SOP0A through the second interferometer path,

(iii) SOP0B through both interferometer paths, and

(iv) SOP0A through the first and SOP0B through the second interferometer path,

respectively, said control and signal processing unit being adapted to extract and further process said interference

signals to produce estimates for the interference phases, visibilities and/or fringe amplitudes of the four interference signals (i,ii,iii,iv).

10. Assembly according to claim 9, wherein SOP0A and SOP0B are orthogonal polarization states, and a first improved phase estimate, called Φ_1, is calculated as the average of the two said interference phase estimates produced from (i) and (iii), and a second improved phase estimate, called Φ_2, is calculated as the average of the two said interference phase estimates produced from (ii) and (iv), and a combined phase estimate is calculated as a weighted average of Φ_1 and Φ_2, where the ratio between the weighting of Φ_1 and the weighting of Φ_2 is decided from the relation between the said interference visibilities or fringe amplitudes.

11. Assembly according to claim 8, wherein said at least two optical paths are constituted by a fiberoptic Michelson interferometer.

12. Assembly according to claim 8, wherein said at least two optical paths are constituted by a fiberoptic Fabry-Perot interferometer.

13. Assembly according to claim 8, wherein said at least two optical paths are constituted by a fiberoptic Mach-Zender interferometer.